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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/519,573	12/30/2004	Masahiko Mitsui	77792/46	8973
23838	7590	11/28/2007	EXAMINER	
KENYON & KENYON LLP			PIGGUSH, AARON C	
1500 K STREET N.W.				
SUITE 700			ART UNIT	PAPER NUMBER
WASHINGTON, DC 20005			2838	
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			11/28/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

717

Office Action Summary

Application No.

10/519,573

Applicant(s)

MITSUI ET AL.

Examiner

Aaron Piggush

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 July 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 and 9-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 9-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 12/30/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Information Disclosure Statement

1. Reference number 7 was crossed out because it is an exact copy of reference number 3.

Claim Objections

2. Claims 1 and 2 are objected to because of the following informalities: The last paragraph of the claim recites "...sets the measured voltage of the battery ...", however, the term "the measured voltage" lacks antecedent basis (even though detect and measure are synonymous terms). Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 12 recites the limitation "second battery full-capacity calculator unit" in line 2.

There is insufficient antecedent basis for this limitation in the claim. Please note that claim 12 is dependent upon claim 4, not claim 11 (which has a first battery full-capacity calculator unit).

5. Claim 14 recites the limitation of three distinct charging/discharging current calculator units in lines 2-3 (estimated, first, and second). There is insufficient antecedent basis for this limitation in the claim because claim 1 only discloses an estimated charging/discharging current calculator unit. Claims 15, 16, and 17 are also rejected because they are dependent upon, and therefore contain, the subject matter of claim 14.

6. Claim 19 recites the limitation "the first SOC estimator unit, the second SOC estimator unit, and the SOC estimator unit" in lines 3-4. There is insufficient antecedent basis for this

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limitation in the claim because claims 1 and 11, upon which this is dependent, only include two SOC estimator units, not three.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-6, 9-11, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Watanabe (US 6,258,163).

With respect to claims 1 and 2, Watanabe discloses a battery state-of-charge estimator comprising: a voltage detector unit which detects a voltage of a battery (no. 12 in Fig. 1 and abstract); an internal resistance estimator unit which estimates an internal resistance of the battery (col 2 ln 36-40, abstract, col 3 ln 36-40, and no. 44 in Fig. 9); an estimated charging/discharging current calculator unit which calculates an estimated charging/discharging current of the battery based on the internal resistance of the battery determined by the internal resistance estimator unit, the voltage of the battery, and an open voltage of the battery (abstract, col 2 ln 53-67, and Fig. 10); an SOC estimator unit which estimates a state of charge of the battery based on the estimated charging/discharging current determined by the estimated charging/discharging current calculator unit (col 3 ln 23-37, abstract, and Fig. 2); and an open voltage calculator unit which sets the detected voltage of the battery as the open voltage of the battery at an initial calculation of the charging/discharging current and, after the initial

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calculation, calculates the open voltage of the battery based on the SOC which is previously estimated (col 3 ln 23-37, abstract, and col 4 ln 26-42).

Furthermore, please note that the charging/discharging current of the battery will always be “based” on the internal resistance of the battery because the internal resistance of the battery directly affects the current into/out of the battery (as noted by the equation of col 4: $V_r = -r \cdot I_b$). Please also note that the SOC and battery voltage are directly related to one another, wherein the battery voltage can be interpreted as an SOC of the battery when compared to the optimum potential voltage level of the battery.

With respect to claim 3, Watanabe discloses the battery SOC estimator further comprising: a temperature detector unit which detects a temperature of the battery (no. 30 in Fig. 3); wherein the internal resistance estimator unit estimates the internal resistance based on the temperature of the battery (col 6 ln 55 to col 7 ln 15 and col 3 ln 7-13).

Additionally, it should be noted that it is also implied that the internal resistance is based off of the temperature of the battery, since the temperature affects the battery in the sense that as the temperature decreases, the internal resistance of the battery increases (e.g. harder to start a vehicle battery in cold weather).

With respect to claim 4, Watanabe discloses a current detector (no. 10 in Fig. 3 and 9), internal resistance calculator and internal resistance corrector (no. 44 Fig. 9, abstract, col 2 ln 35-40, and col 3 ln 30-43). Please also see the rejection of claims 2 and 3 above.

With respect to claim 5, see the rejection of claim 3 above.

With respect to claim 6, see the rejections of claims 1, 2, and 4 above.

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With respect to claim 9, Watanabe discloses wherein the temperature detector unit is placed in the battery, on a surface of the battery, or near the surface of the battery (implied since the temperature sensor must meet at least one of those requirements in order to actually sense the battery temperature). Also see the rejection of claim 3 above.

With respect to claim 10, Watanabe discloses wherein the SOC estimator unit periodically estimates the SOC at a predetermined interval (Fig. 2 and 8 and abstract).

With respect to claim 11, Watanabe discloses the SOC estimator further comprising: a current detector (no. 10 in Fig. 3); a first battery full-capacity calculator unit which determines a full capacity of the battery based on the SOC which is estimated by the SOC estimator unit and an integrated value of the charging/discharging current of the battery (S2-S4 in Fig. 2, abstract, and "battery model" section of Fig. 3); and a second SOC estimator unit which estimates a state of charge of the battery based on the full capacity of the battery (S7 in Fig. 2, no. 26 in Fig. 3, and abstract). Please also note Fig. 6 in 1-53 for a more detailed description of Fig. 2.

With respect to claim 18, please see the rejection of claim 9 above.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe (US 6,258,163) in view of Sakai (US 6,608,482).

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With respect to claim 13, Watanabe does not disclose wherein a remaining capacity detector unit detects a remaining capacity of each individual cell within the battery or a remaining energy calculator unit which detects a minimum remaining capacity based on the remaining capacity of each individual cell.

Sakai discloses wherein a remaining capacity detector unit detects a remaining capacity of each individual cell within the battery (col 6 ln 3-9) and wherein a remaining energy calculator unit which detects a minimum remaining capacity based on the remaining capacity of each individual cell (Fig. 4, abstract, and col 1 ln 61 to col 2 ln 21), in order to take all the cells of the battery into account (which gives a more accurate representation of the SOC).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to include a remaining capacity detector unit and a remaining energy calculator unit (as mentioned above) in the device of Watanabe, as did Sakai, so that a more accurate reading for the state of charge could be presented, which would include the effects of uneven degradation of individual battery cells.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aaron Piggush whose telephone number is 571-272-5978. The examiner can normally be reached on Monday-Friday 9:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Akm Ullah can be reached on 571-272-2361. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AP



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PRIMARY EXAMINER